FROM AGRICULTURAL TO MANUFACTURING-BASED ECONOMY:
The Malaysian Quest for Economic Success[1]

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Proses industrialisasi di Malaysia telah berhasil melakukan transformasi ekonomi dari suatu negara agrikultur menjadi negara industri manufaktur. Hal ini nampak dari kontribusi sektor industri manufaktur terhadap GDP yang cenderung selalu meningkat dari 14,8 persen pada tahun 1970 menjadi 33 persen pada tahun 1995. Saat ini Malaysia sedang mempersiapkan diri untuk menjadi negara industri yang akan dicapai pada tahun 2020 mendatang dengan melakukan perubahan besar terhadap struktur perekonomiannya. Meskipun sampai saat ini sektor industri mampu berperan sebagai mesin pertumbuhan ekonomi di Malaysia, namun proses industrialisasi tersebut telah menyebabkan terjadinya surplus tenaga kerja dan kenaikan upah di sektor industri.

Selain itu, proses industrialisasi di Malaysia belum mampu menciptakan keterkaitan intra dan inter industri dalam struktur ekonomi. Akibatnya, industri produk ekspor dan industri pengolahan cenderung tidak memiliki keterkaitan dengan suplier dalam negeri.

Artikel ini membahas proses industrialisasi beserta tantangannya, dan penerapan strategi baru industrialisasi di Malaysia untuk mencapai perekonomian dinamis yang ditopang sektor industri pada tahun 2020 mendatang.

Keywords: Malaysia; agricultural economy; industry; developing countries; manufacture

Introduction

The Malaysian industrialization process has effectively transformed the country's economy from a simple agricultural production economy to one based on manufacturing and industry. The manufacturing sector's contribution to GDP increased from 14.8 percent in 1970 to about 33 percent in 1995. It is now poised for greater growth to propel the nation into a full-fledged industrial nation by the year 2020. Despite its remarkable performance and significant role as the engine of eco-

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nomic growth, the Malaysian manufacturing sector is now at a crucial point. Labor surpluses are exhausted, and wages have continued to increase to an alarming level relative to other developing countries in South East Asia. Furthermore, the lack of inter and intra-industrial economic linkages in the manufacturing sector, has given rise to a large number of industries producing exportables and final goods without a strong network of suppliers and basic economic factors.

This article reviews the performance of the Malaysian economy, and discusses the industrialization process and its challenges, and the new industrial strategy aimed at moving towards a more mature and sustainable manufacturing sector in Malaysia.

Malaysia's Macroeconomy - A Review

Malaysia covers an area of 330,000 sq. km, with a population of about 20 million in 1995. About 83 percent of its population live in Peninsular Malaysia while the rest in East Malaysia. There was a structural shift in terms of population distribution, with the rural population de-

Table 1. **Annual Growth Rates in Malaysian GDP, 1971-1995**

Period Year	1971-75 (1970-100)	1976-80 (1970=100)	1981-85 (1978=100)	1986-90 (1978:100)	1990-95 (1978=100)
First	6.5	11.6	6.9	1.2	8.7
Second	9.4	7.8	5.6	5.2	7.8
Third	11.7	6.7	6.3	8.9	8.3
Fourth	8.3	9.3	7.6	9.2	8.5
Fifth	0.8	7.3	-1.0	9.7	8.5
Average	7.3	8.6	5.1	6.7	8.4

Source: *Economic Report*, Ministry of Finance (various issues)

Table 2. **Malaysian GDP by Sector, 1970 - 1995**

Sectors/Year	1970	1980	1990	1995
Agriculture, Forestry and Fishery	29.0	22.9	18.7	13.5
Mining and Quarrying	13.7	10.1	9.7	7.4
Manufacturing	13.9	19.6	27.0	33.1
Construction	3.8	4.6	3.5	4.5
Service	39.6	42.8	42.1	44.3

Source: *Economic Report*, Ministry of Finance (various years)

clining from 73 percent in 1957 to only 47 percent in 1993. This decline, despite the higher birth rate in the rural areas, is strongly attributable to the post-1970 rapid industrialization and urbanization processes which triggered rural-urban migration.

Malaysia's economic growth has been remarkable. The economy grew at an annual rate of 4.1 percent in the late 1950's, up to 7.3 percent between 1971-75, reaching 8.4 percent between 1990-95 (Table 1). Real GDP increased from RM 21.5 billion in 1970 to RM 79.1 billion in 1990, and RM 120.3 billion in 1995 (note RM 1 = US$ 0.4). Low growth and even negative growth were experienced during the recession years of 1984-1986. The period 1988-1989 were years of economic recovery, followed by high sustained growth in the 1990's. Malaysia's GNP per capita increased more than 3 fold between 1970 and 1994, from RM 1798 to RM 5626. This reflects a general increase in the quality of life of its population.

Overall economic growth in Malaysia is associated with a structural transformation of the economy from a simple agricultural production economy to an industrial economy. This brought changes in the sectoral contribution to GDP and export share.

The share of agriculture as percentage of GDP declined from 29 percent in 1970 to 13.5 percent in 1995 (Table 2). This decline has been off-set by a more

Table 3. **Employment by Sector (' 000 persons)**

Sector	1970	1984	1995
Agriculture	1,787 (53.5%)	1,724 (31%)	1,428 (18%)
Mining	87 (2.6%)	47.2 (2.2%)	40.7 (0.5%)
Manufacturing	290 (8.7%)	878.9 (15.80/,)	2051,6 (25.9%)
Construction	91 (27%)	442,3 (7.9./,)	659,4 (8,3%)
Government Services	404 (12.0%)	811.4 (14 6%)	872.0 (1 1.0%)
Business and Other Service	681 (920.5%)	1,660.9 (29.9%)	2,863 (36.3%)
Total Employment	**3,340 (100%)**	**5,564.7 (100%)**	**7,915.4 (100%)**
Labor Force		5,907	8,140
Unemployment		342.3	224.6
Unemployment Rate		**5.8%**	**2.8%**

Source: *Economic Reports*, Ministry of Finance (various years)

Table 4. **Average Sectoral Shares of Exports Commodities (percent)**

	1961-65	1966-70	1971-75	1976-80	1981-85	1986-89	1995
Rubber	4. 6	35.8	27.8	20.4	10.3	9.0	1.2
Tin	20.0	19.7	15.4	10.6	5.1	1.8	0.3
Logs	5.7	12.1	9.4	10.4	8.8	8.3	3.1
Timber	2.1	3.2	5.5	5.5	3.7	3.6	-
Palm Oil	2.2	3.4	9.3	10.0	10.3	8.0	4.0
Petroleum	2.8	3.5	6.4	16.2	24.4	13.4	54
Mnufacturing	-	11.9	16.1	20. 1	29.0	45.6	79.8
Others	24.6	10.3	8.2	6.8	8.3	10.4	6.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *Economic Report,* Ministry of Finance (various years)

than corresponding increase in the manufacturing sector, from 13.9 percent in 1970 to 33.1 percent in 1995. The growth rate of the agricultural sector declined from 5 percent in the 1970's to only 2 percent in 1995, while the manufacturing sector grew at an average annual rate of 11.6 percent between 1971-75, and 12.5 percent in 1995.

The share of the mining sector also declined from 13.7 percent in 1970 to 7.4 percent in 1995, while the share of the construction sector increased marginally from 3.8 percent to 4.5 percent over the same period. However, the latter has been growing at an annual rate of 11-13 percent in the 1990's. The share of the service sectors has always been high, increasing from 39.6 percent in 1970 to 44.3 percent in 1995.

A structural shift in employment is also observed with agricultural employment declining from 53.5 percent in 1970 to 18 percent in 1995 (Table 3). A similar decline in employment was experienced by the mining sector, decreasing from 2.6 percent in 1970 to 0.5 percent in 1995. All other sub-sectors experienced increases in the share of employment, thereby offsetting the decline in agricultural and mining.

As was expected, the manufacturing sector experienced the largest percentage increase, from 8.7 percent in 1970 to 25.9 percent in 1995. Employment in the non-governmental service sector increased from 20.5 percent to 36.3 percent, while employment in government service sector declined moderately from 12 percent to 11.0 during the same period.

Another transformation is seen in the diversification of exports. Malaysia's transformation from a primary producer of industrial crops (oil palm and rubber) and natural resources (tin logs, timber and petroleum) to an industrializing economy is evident from the share of exports (Table 4). Like production and employment, manufacturing exports rocketed from 11.9 percent in 1970 to 79.6 percent in 1995 (Table 4). Manufacturing exports comprise mainly electrical/electronic products, processed agricultural products and tex-

tiles/apparel. Since the 1970's the government has promoted a range of strategies and incentives to encourage foreign and domestic investment, and to diversify its economic base, thereby accelerating its industrialization process. This manufacture-led export growth has meant a decline in exports of primary commodities, from some 73 percent between 1961-65 to less than 10 percent in 1995.

Malaysian Industrialization Process

As shown in the preceding section, manufacturing has played a major role in the economy, supporting government's desire to reduce Malaysia's dependency on export of primary commodities (Table 4). Prior to independence in 1957, the British colonial rulers were reluctant to establish policies favoring domestic production. This was because import substituting goods would reduce import tariff revenue to the government, and would also raise prices of such goods, thereby pushing wages upwards and reducing profits for the British employers. Plantation rubber agriculture and tin mining were thus the dominant economic activities.

The Malaysian industrialization process started in the late 1950's with an import substituting industrialization strategy (ISI) which continued until the 1960s. The focus of the strategy was to encourage foreign investors to set up production assembly and packaging plants in the country to supply finished goods previously imported from abroad. Government intervention was limited to providing infrastructural facilities and related incentives. To promote the development of infant import substituting industries, the government directly and indirectly subsidized the establishment of factories and protected the domestic market by imposing high

Figure1. **The Evolution of Malaysian Industrialization Processes**

1.	Colonial Rule	⇨ FDIs in Plantation Agriculture
2.	1956	⇨ FELDA was established
3.	1957	⇨ Malaysia gained independence
4.	Late 1950's-1960's	⇨ Import-Substituting Industries (ISI)
5.	1969	⇨ Racial Riots & NEP (New Economic Policy)
6.	Early 1970's	⇨ Proliferation of Public Agencies for Socio-Economic Development
7.	Heavy Industrialization	⇨ A strong EOI/second round ISI Setting of HICOM (Heavy Industries Corporation of Malaysia)
8.	Mid 1980's	⇨ Privatization and Corporatization
9.	1986-1995	⇨ IMP 1 (Industrial Master Plan 1)
10.	1991	⇨ Vision 2020 was mooted
11.	1996-2005	⇨ IMP2 (cluster-based industrialization)
12.	2020	⇨ Fully-fledged industrial nation

import tariffs. Incentives in the form of income tax exemption was also a key element of this strategy. The majority of the import-substituting industries were set up by foreign- owned companies via foreign direct investment (FDI). For instance by 1970, more than three-fifths of all manufacturing and mining output in Malaysia was under the control of foreign companies. Although the ISI produced moderate growth in GDP of 5.4 percent annually for the period 1966-70, and the manufacturing sector grew at 13 percent annually, the strategy had several drawbacks. These included the problems of limited domestic markets for expansion, high consumer prices and low capacity to create employment opportunities.

Capital-intensive industries were expanding much faster than labor-intensive ones, causing job creation to lag considerably behind investment growth during the period of ISI. There was also very little transfer of skills and technology. This promted the government to introduce an export-oriented industrialization strategy (EOI).

By the mid-sixties, the weaknesses of the Malaysian import-substitution strategy had become very clear. The government established the Raja Mohar Committee to find measures to enhance industrial growth. This resulted in the 1968 Investment Incentives Act which encouraged the expansion of manufactured exports. The Federal Industrial Development Authority (FIDA), now known as MIDA (M for Malaysian) which had been established in 1965 activated in 1967 to attract investments and promote manufacturing.

By the late 1960's, industrial development could not prevent the build-up of racial animosity which led to the racial riots of May 1969. Income distribution in that period was indeed more unequal than a decade earlier (Jomo and Edwards, 1995). In early 1970's, the declaration of the New Economic Policy (NEP) which sought to eradicate poverty irrespective of race and to eliminate the identification of occupation with race, coincided with the new phase of EOI.

Labor laws were also amended in late 1969, after the declaration of a State of Emergency to more effectively use and manage labor in the new, mainly labor-intensive export-oriented industries. The Registrar of Trade Unions was given powers to prevent workers from forming unions, allowing night shifts for women, and restricting trade union activities and rights.

The EOI Strategy

The EOI strategy was based on labor-intensive activities in order to take advantage of the surplus labor at the time. This strategy provided a fresh push for industrial growth. The new focus was supported by the NEP's commitment to modernizing Malaysia's open capitalistic economy. By the early 1970's, government efforts to attract and encourage export-oriented industries were in full force. New measures, most notably the establishment of free trade zones (FTZs) were introduced to facilitate Malaysian manufacturing production for export mainly using imported materials. Such export orientation at the time was consistent with the emerging practice of multinational enterprises to relocate production units and assembly lines to secure locations offering low wages and other production costs. Development of FTZs in Malaysia was immense. A study of FTZs or export processing zones in Malaysia noted that: "..... is unique among the developing countries establishing these zones. Nowhere else is their role as significant, either in absolute terms or

as a proportion of overall manufacturing activity" (Warr, 1987, p. 30).

The two main types of export-oriented industries developed were (1) resource-based industries which involved increased processing of older commodities such as rubber and tin, and (2) the newer primary export commodities such as processed palm oil and timber. Although the resource-based industries have expanded greatly, non-resource based export industries have been more successful in terms of growth and job creation since the late 1970s. The most dramatic growth has involved electrical and electronic components, which has accounted for more than half of manufactured exports since the mid-1980s. A labor surplus with relatively high education and low wage rates, macro-economic and political stability, open economy, as well as a conducive investment climate were some of the factors for the success of the EOI.

Despite the remarkable success of the export-oriented industries under the EOI policy, very little net foreign exchange was saved. For instance, during the 1972 - 82 period, net exports accounted for only about RM 6.8 million of total sales (mainly exports) of RM 23.1 million (MIPS, 1984). This was attributable mainly to the large imported material inputs component (70 percent of gross sales). Furthermore, most of the companies in the FTZs were still foreign-owned. Thus, most of the profits made were remitted to their home countries. Under the EOI, there was still little technological transfer or development of new skills in the FTZ industries. The degree of economic linkages between FTZ firms and the domestic economy was also still lacking.

The early 1970s (under the NEP) also witnessed a proliferation of public institutions (both federal and state levels) related to socio-economic and in particular agricultural-rural economic development. These institutions were primarily aimed at uplifting the socio-economic well being of the mainly rural Malaysia, who represented the poorest ethnic group at the time.

Heavy Industrialization

In the early 1980's, a strong EOI sector had emerged in Malaysia, with its roots in the ISI sector promoted through the 1960's. In the beginning of the 1980's, there was a strong push for heavy industrialization by the Malaysian government. This second round ISI followed the South Korea model, consistent with the "Look East" policy, adopted by the government under leadership of Mahathir Mohamad in the early 1980's. A new public agency, the Heavy Industries Corporation of Malaysia (HICOM) was created to spearhead the heavy industrialization program. Part and parcel of this program was the national car project (Proton), the Perwaja iron and steel plant, petrochemicals, and cement plants. These industries were given high tariff protection as well as direct government assistance.

Privatization

When the economy entered a deep recession in the mid 1980's, the government decided to deregulate the economy by reducing its leading role in generating economic activities. One of the key measures adopted by the government was privatization. Many key sectors handled by government agencies were corporatized or privatized so as to downsize or "right size" the government machinery and to allow government enterprises operate in a more competitive economic environment, and to become more responsive to changing global scenarios. As part of the mea-

sures to enhance participation of the private sector in the economy, several key sectors including telecommunications and financial services were deregulated. Investment rules were also moderated, while exchange rates were allowed to depreciate.

These measures had immense impact on economic growth, manufacturing exports, and employment generation from the late 1980's to present. In 1995 the manufacturing sector accounted for 25 percent of employment opportunities and some 78 percent of export share. However, some industries (the labor intensive industries) of late have started to lose their comparative advantage and have been forced to find new market niche.

The 1986-95 period, considered the best period for Malaysia in terms of economic growth, coincided with the period of the First Industrial Master Plan (IMP1). The Second Industrial Master Plan (IMP2), 1996-2005 focuses on strengthening inter and intra-sectoral economic linkages, deepening and diversification of the manufacturing sector, development of indigenous capacity, and development of technology. The strategies of the IMP2 will be discussed in greater detail after the following two sections concerning the roles of capital accumulation and FDIs, and challenges facing the Malaysian manufacturing sector.

Capital Accumulation, FDIs and Manufacturing Growth

Capital accumulation is the key to the Malaysian industrialization process. In the 1970's gross investment accounted for more than 20 percent of GNP, reaching 40 percent in the 1980's and 1990's. However, the pattern of investment changed in terms of the relative importance of the public versus the private sector, along with the increased roles of FDIs.

The focus of private sector investment was on manufacturing, followed by services, construction, and oil and gas. In the 1990's, investment in the manufacturing sector accounted for 29 to 49 percent of total private investment. Investment in the service sector, especially on transport and utilities has also increased rapidly in the mid 1990's.

The 1990's has seen a pronounced rise in infrastructure investment in Malaysia. In 1994 infrastructure investment as a share of GDP was about 10 percent: more than twice the level in 1985. The rapid economic growth has stimulated demand for transportation, telecommunications, electricity and other basic infra structure. The rapid industrialization process and global economic integration has spurred demand for more sophisticated facilities. In Malaysia, until recently, infrastructure investment was traditionally carried out by the public sector. However, consistent with the government policy to "right size" the public sector through corporatization and privatization programs, private sector participation in infrastructure investment increased rapidly, even in hard core traditional areas such as highways and severage. The first large private sector infrastructural development project was the North-South highway project which started in 1985. In the 1990's, private sector participation expanded into areas such as electricity, sewerage and water.

The inflows of FDIs over the years in Malaysia undoubtedly, contributed directly to the expansion and diversification of the Malaysian economy, in particular within

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Table 5. **Inflows of FDIs, 1971-1991 (Millions RM; RM 1 = US$ 0.4)**

Year	FDIs	Total Investments (TI)	FDI/TI Ratio	Growth Rate of FDIs (percent)
1971	96.4	463.4	17.1	-
1972	149.0	359.3	41.5	54.6
1973	254.1	544.9	46.6	70.5
1974	264.1	759.1	34.8	3.9
1975	155.3	564.5	27.5	-41.2
1976	114.1	458.5	24.9	-26.5
1977	107.9	357.9	30.1	-5.4
1978	177.8	480.2	37.0	64.8
1979	495.6	1,254.7	39.5	178.7
1980	248.2	752.9	33.0	-49.9
1981	495.3	1,709.1	29.0	99.6
1982	527.6	1,921.5	27.5	6.6
1983	296.3	1,022.4	29.0	-43.8
1984	275.4	1,213.4	22.7	-7.1
1985	324.2	1,823.7	17.8	18.0
1986	524.3	1,878.8	27.9	61.4
1987	750.7	1,529.3	49.1	43.1
1988	2,010	3,469.7	58.0	167.8
1998	3,401.2	,693.4	73.9	69.2
1990	6,228.0	9,639.1	64.3	83.1
1991	5,553.8	9,450.1	58.5	-10.8

Source: Anuwar and Wong (1993); Anuwar and Tham (1993)

the manufacturing sector. Most industry analysts and academic observers have attributed the inflows of FDIs mainly to the relatively stable political framework (the National Front framework) in Malaysia, the commitment of the government to provide conducive economic environment/ incentives to foreign investors, the existence of a surplus and an educated workforce with strong competency in the English language, a high income per capita despite a small domestic market (e.g. in 1993 Malaysia's per capita income was US$ 3140, Indonesia US$740, Thailand US$2110, Pakistan US$430 and Bangladesh US$220), relatively transparent government procedures, and a conducive social environment with low crime rates.

The inflows of FDIs to Malaysia accelerated beginning in the late 1970's (Table 5). In 1984 and 1985, in the midst of world economic recession, there was a marked decline in FDIs. In 1986, the government moved to liberalize equity ownership and for the first time the FDIs exceeded domestic investments. The receipts

Table 6. **Inflows of FDIs to Selected Developing Countries for 1993 ('mill US$)***

Country	Total	Percentage
China	27,515	47.7
Singapore	6,829	11.8
Argentina	6,305	10.9
Malaysia	**5,206**	**10**
Mexico	4,901	8.5
Indonesia	2,004	3.5
Thailand	1,715	3.0
Hong Kong	1,607	2.8
Columbia	950	1.6
Taiwan	917	1.0
Total	58,009	100

* These countries received 79 percent of world's FDI inflows in 1993.

Source: United Nation (1995)

of FDIs for Malaysia in relation to other developing countries have also been high. In 1993, for instance, Malaysia received about 10 percent (ranked fourth) of world's total FDI inflows to developing countries (Table 6).

In the late 1960's and early 1970's, FDIs focused on simple import-substitution industries such as consumer and intermediate goods. From the mid- 1970's to early 1980's, substantial FDIs went into petroleum and gas-related sectors as well as the manufacturing industries located in the FTZs. In the mid 1980's efforts were geared toward attracting FDIs on the premise that large multinational corporations would have the capacity to access foreign markets and provide technological expertise and experience to the local economy. Tables 7 and 8, show the main industries which gained foreign equity, and the sources of approved FDIs.

Table 7. **Main Industries Gaining Foreign Equity (percent)**

Industries	1985	1990	1994
Basic metal products	11.7	24.5	3.6
Petroleum products	0.1	8.7	2.1
Chemicals & chemical products	3.5	10.5	7.3
Electrical & electronic products	8.5	26.6	43.3
Wood & wood products	0.8	2.9	8.2
Textiles & textile products	58	50	10.2
Machinery	5.4	5.8	26
Fabricated metal products	3.6	2.1	17
Food products	8.81	21	1.6
Transport equipment	17.3	17	24
Others	345	101	168
Total	100	100	100

Source: Aziz (1996)

Table 8. **Sources of Approved FDIs (percent)**

Countries	1985	1990	1995
Taiwan	4.5	378	24,8
Japan	25.1	28.5	17.1
U S	11.3	30	13,7
Korea	3.2	26	3.3
Singapore	14.5	5.2	8.8
Hong Kong	5,7	22	7,2
Indonesia	1.6	36	-
United Kingdom	3.3	5.1	1.4
Others	30.8	12,0	23.7
Total	100	100	100

Source: Aziz (1996)

Constraints and Challenges Facing the Malaysian Manufacturing Sector

Despite the spectacular growth of the manufacturing sector over the past decade and the expectation that the sector will propell growth in the future, the sector is facing numerous structural constraints and challenges that might inhibit its sustainability. Industry analysts and academic observers have identified some of these constraints and challenges as follows:

Weak/Narrow Structural Linkages

Some major industries have very minimal intra and inter-industrial linkages. Notable examples are the electronic and electrical (E&E) industries. Some analyst even describe the Malaysian manufacturing sector as "hollow", meaning there is very little domestic support with regards to material input requirement for the manufacture of final goods. For instance, although Malaysia is a notable exporter of E&E products, ironically, these products not used as inputs in other industries (e.g. the automobile industry). The resource-based industries, notably palm oil, rubber, and wood processing industries on the other hand have extensive domestic economic linkages. However, for some resource-based industries (notably palm oil processing), increasing input cost attributable to labor shortages in the primary production sector has forced manufacturers to import inputs from abroad.

Small Domestic Market

The small domestic market does not allow certain industries such as the automobile industry, to operate on the basis of economies of scale. Thus production costs are much higher than world average. The massive trade tariff to support these industries causes domestic consumers to suffer heavy welfare losses.

Tabel 9. **Shares of Manufacturing in GDP, 1970-1993**

Country	1970	1993	Percentage Change
USA	25	18	-26.80
UK	33	25	-24.24
France	29	22	-21.43
Germany	38	27	-28.95
Australia	24	15	-37.50
Japan	36	24	-33.33
Korea	21	29	38.10
Hong Kong	29	13	-55.17
Taiwan	35	39	11.40
Singapore	20	7	85.00
Malaysia	**12**	**29**	**150.00**
Indonesia	**10**	**22**	**120.00**
Thailand	**16**	**28**	**75.00**
Philippines	**25**	**24**	**-4.00**
China	30	38	26.67
Argentina	32	20	-37.50
Brazil	29	20	-31.03
Mexico	22	20	-9.09

Source: World Bank (1995)

Human Resources

The problem of unskilled labor shortage has been temporarily eased by the influx of labor from neighboring countries. This has allowed the labor intensive industries to thrive even though they are losing comparative advantage in operations. The relatively "mobile" international labor coming to Malaysia has also to a large extent discouraged the enhancement of industries into higher capital and knowledge-based operations.

Efforts to move the manufacturing sector to more technology intensive and higher value adding activities are being hindered by the limited pool of workers in relevant areas, especially in engineering and information technology. Malaysia is facing acute shortage in critical fields such as design engineering, CAD/CAM and material science in particular. Equally serious shortages are being experienced in the supporting sectors, such as technicians in the machine tools industry.

Associated with the problems of labor shortage is the rapid rise in real wages. For the 1991-93 period, real monthly wages rose by 3.7 percent per annum. This wage rise was not accompanied by a corresponding increase in productivity, showing the gravity of the labor shortage problems in Malaysia.

Several indicators would further indicate the seriousness of Malaysia's hu-

man resources issues. The tertiary enrollment rate in Korea, for instance, increased from 16 percent to 42 percent between 1980 and 1992, while the rates for Japan were 31 percent and 32 percent and for the U.S. 56 percent and 76 percent, respectively (World Development Report, 1995). In contrast, Malaysian rates were only 4 percent and 7 percent. Enrollment in science and technical subjects at tertiary level in Korea and Taiwan out stripped that of Malaysia. Enrollment in these two countries was more than 6 times higher, while in engineering, they were 8 and 10 times higher respectively.

Unlike the NICs of South Korea and Taiwan, Malaysia is heavily dependent on foreign technology for its manufacturing capacity, and to date does not have adequate domestic technological base. Japan, Taiwan, and Korea have also been very capable in sourcing and improving foreign technology, imported technology in Malaysia has not been transferred successfully and very little effort has been made to enhance imported technology.

This could be attributable to the nature of the Malaysian industrialization process. As was noted earlier, the expansion in the manufacturing sector in Malaysia was spurred to a great extent by the massive influx of FDI (sometimes known as the short-cut model). In Korea, the advancement was largely attributable to "natural" process of domestic investment and human resource development in the manufacturing and heavy industries. Korea's Research and Development (R&D) expenditure of 2.3 percent of GDP is comparable to that of Japan (2.8 percent), while Taiwan's share was a little lower (1,8 percent). In contrast, Malaysia's R &D expenditure was only 0.37 percent of GDP.

Because of the large budget outlay, most R&D in Malaysia is carried out by the government. There is also no strong framework which links the public sector R&D institutions and the private manufacturer users, giving rise to inefficient budget utilization and ineffective use of R&D findings. Private corporations in Malaysia are quite unwilling to undertake R&D investments because of the small domestic market for potential market expansion. On the other hand, the multinational corporations (MNCs) which brought in the FDIs normally undertake their R&D in the home countries of the parent companies.

Technology in Malaysia is normally acquired through technical arrangements with foreign design franchise holders. These sort of arrangement, covering very specific and limited areas, are very costly because of the excessive multiple payments of training fees, technical assistance fees, and royalties. In the automotive industry, 60 percent of the national car vendors are involved in these sorts of technological arrangements (Mahani, 1996).

Economic Integration

Under WTO rules, it is very unlikely that member countries would revert to more restrictive trade or massive subsidization of exports. Malaysia has given its commitment to reduce tariffs on more than 7000 items, and to gradually allow foreign service providers to operate in domestic markets. Even though the WTO framework calls for a freer trade and transparent multilateral trading arrangements, there are still legal avenues for countries to practice trade discrimination. For instance, countries may be allowed to place trade restrictions if importing is proven detrimental or injurious to domestic industries.

It is also expected that anti-dumping measures which are currently practiced by the U.S. and Europe will be carried out by other advance or developing importing countries.

Of more immediate importance is the economic evolution within ASEAN itself. The regional trading arrangement, AFTA, has advocated and agreed to a tariff reduction for goods traded in the region to 5 percent or less by 2003. The competitive edge would then be based on economic efficiency as there would be less trade measures enhancing. As most ASEAN economics are in general undergoing the same phase of development, trade competition among member countries would be more intense. Several developed countries have seen this as an opportunity for increased market share. For instance, Japanese manufacturers are building world scale production capacity in the manufacture of automotive parts in Thailand to gain from the trade reforms AFTA is offering.

Industrial Concentration

One of the marked negative effects of FDIs is the increased concentration of industries in Malaysia. An industry is considered as oligopolistic if the concentration ratio for its four largest firms is more than 40 percent. The Federal Bank (1990 Annual Report) reported that 80 percent of the industries in Malaysia can be classified as oligopolistic. Foreign firms are also found to be oligopolistic. Given this structure, aspiring domestic firms which are relatively small will find it difficult to gain market share or penetrate new markets.

Environmental Impacts

Environmental consciousness in Malaysia is not only attributable to external concerns, but also to domestic pressures which have of late been gaining stronger momentum. Malaysians at large have become increasingly concerned about the depletion and degradation of the country's natural resources and environmental quality. The problems of acid rain, industrial wastes, and polluted rivers have become important headlines in major newspapers in Malaysia. The welfare loss as a result of the environmental degradation due to the rapid industrialization process could be enormous, but is yet to be quantified in monetary terms.

Undeniably, the increased environmental degradation and pollution is strongly linked to the proliferation of FDIs and associated industrial activities. As was noted in Table 7, a large chunk of the FDIs goes into environmentally sensitive areas such as the metal processing, chemicals, electrical and electronics. Likewise Malaysia's very own domestic "pet", resource-based industry —palm oil processing— has been especially targeted by domestic and international environmentalists as a significant contributor to environmental degradation.

Associated with the problems of industries and the environment is the government strategy on rural development which involves the locating of industries in rural areas. This strategy seems plausible for generating better paying jobs for the rural poor, but in the process the rural areas become "urbanized," consequently destroying the rural agricultural landscape, and creating a host of environmental and social problems. The Malaysian government is expected to come up with more comprehensive policies and strategies that would consider all the dimensions of sustainability —economic, social, and the environment— in macro and micro economic development planning.

The Industrial Master Plan - The Way Ahead

The IMP1, 1986-1995 (funded by UNIDO) was introduced with a strong focus on the continuation of the EOI strategy with special emphasis on further diversification and fostering economic linkages of both the resource and resource-based industries. The plan also highlighted the importance of preparing the workforce for technical and industrial skills and the dispersal of industries to non growth center areas. The IMP1 had three broad objectives:

- to ensure a continued expansion of the economy through accelerated growth of the manufacturing sector to meet the objectives of the NEP/New Development Policy (NDP);

Table10. **Kondratieff Cycles: Shifting of Techno-Economic Paradigm, 1770-1980**

(1770-1840)	(1830-1890)	(1880-1940)	(1930-1990)	(1990-??)
	Techno-Economic Paradigm			
Early Mechanization	Steam Power and Railways	Electrical and Heavy Engineering	Fordist Mass Production	Information and Communication
	Growth Sectors			
Textiles	Steam engines	Electrical engineering/ machinery	Automobiles	Computers
Machinery	Railways	Cable and wire	Aircraft	Electronic
Chemicals	Railway Equipment	Steel products	Synthetic materials	Capital goods
Iron casting	Machinery tools		Petro-chemicals	Telecommunication
				New materials Robotics Biotechnology
	New Innovations			
Steam engines	Steel	Automobiles	Computers	
Machinery	Electricity	Aircraft	TVs	
	Gas	Radio	Radar	
	Synthetic dyestulls	Aluminium	Drugs	
		Plastics	Nuclear power	
		Oil	Numerical control machine tools	

Source: Freman (1986)

- to promote efficient use of the nation's natural resources through value adding manufacturing activities; and
- to provide the foundation for the development of indigenous technological capabilities.

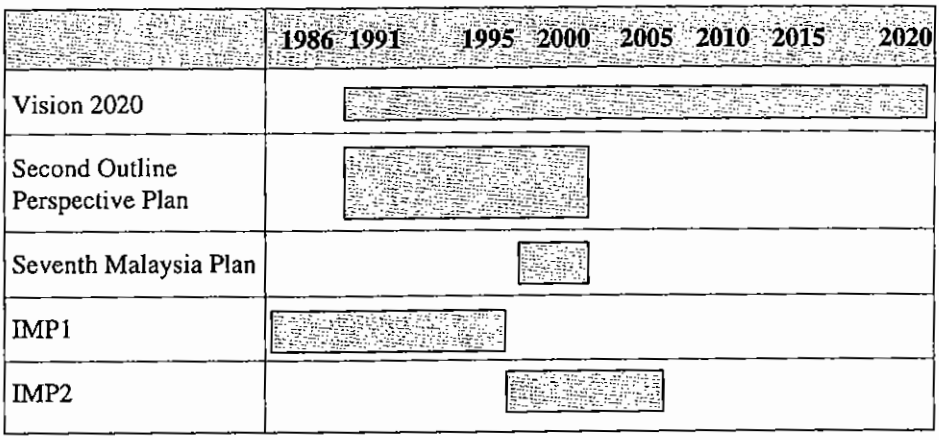
As was discussed in the preceding sections the IMP1 period successfully propelled the Malaysian economy to accelerated growth through the manufacturing sector. The IMP2 was introduced in 1996, formulating the long term industrialization path for Malaysia up to 2005. The IMP2 is based upon the success of the IMP1, and addresses the challenges that have been identified to sustain and enhance the growth momentum of the industrial sector. The IMP2 prioritizes the following (MITTI, 1996):

- improving the economic foundation, which include continues improvement in terms of quantity and quality of human resources, development of indigenous R&D capacity and technology, adequate supply of modern infrastructure and the provision of efficient related business services;
- the need to accelerate, deepen and diversify the manufacturing subsectors and enhance greater linkages between and within industrial subsectors;
- the need to accelerate the development of indigenous technological capacity; and
- to strengthen economic linkages through the further development and expansion of intermediate and supporting industries and to address the issue of high imports of intermediate and capital goods.

It is evident that the IMP2 places special focus on activities beyond the traditional manufacturing operations, to include R&D and design capacity, development of integrated supporting industries, packaging, distribution and marketing activities. The IMP2 describes this emphasis as the Manufacturing ++ strategy. The Manufacturing ++ strategy requires the implementation of five strategies:

1. ***Global Orientation***
   This demands the manufacturing sector to move from being purely export driven to becoming world class and world scale.
2. ***Enhancing Competitiveness***
   This necessitates continuous enhancement of competitive capacity through cluster-based development which would strengthen economic linkages within and across industries.
3. ***Improving Economic Foundation***
   This includes human resource development (HRD), technology development, acquisition and absorptive capacity, physical infrastructure, supportive administrative roles add procedures, economic incentives, and business support services.
4. ***Malaysian-owned Manufacturing Companies***
   While not neglecting the importance of FDIs in the manufacturing sector, the government realizes that Malaysian-owned companies must assume greater roles in the next phase of industrialization. This requires the increased participation of domestic companies in the broad range of manufacturing activities especially in the clusters that have been identified of strategic importance. This will lead to higher retention of income, while increasing the domestic share of the value-added created by the manufacturing sector.
5. ***Information-intensive and Knowledge-driven Processes***
   Manufacturing and related supporting activities will need to employ increased use of information technology and other knowledge-driven processes.

Figure 2. **The IMP in the Context of Long Term Plans**



Source: MITTI, 1996

The share of the manufacturing sector is expected to reach 38 percent of the GDP in 2005, up from 33 percent in 1995. Manufacturing exports on the average are expected to grow at 16 percent per annum. The share of the manufacturing sector in terms of employment is expected to increase from 26 percent (12 million) in 1996 to 29 percent (2.8 million) by the end of the IMP2 period.

The IMP2 and Vision 2020

The Malaysia Vision 2020 envisages Malaysia as a fully-fledged developed country by 2020. The achievement of this vision is contingent to a large extent on the successful performance of the IMP2. The IMP2 in the content of Malaysian long term development plans is depicted in Figure 2.

Cluster-Based Industrial Development

The cluster-based industrial development under the IMP2 advocates concurrent growth of the manufacturing sector along with its supporting clusters. The success of the IMP2 thus necessitates the simultaneous support and development of all related sectors, including the service sector. The unique strength of the cluster-based approach is that it provides a basic framework which addresses the issue of market (domestic and international), structural linkages and networks and relate them to the underlying competencies which are central to the competitiveness of industrial clusters.

The identification of clusters is based on linkages and contribution to manufacturing value added. The four key elements underlying the cluster-based industrial development approach are (MITTI, 1996):

* ***Cluster***

A cluster is an agglomeration of interlinked or related activities comprising industries, suppliers, critical supporting services, infrastructure and institutions that are interdependent. Within the cluster, firms form partnerships with suppliers and even competitors to enhance value-added activities. They draw upon a common labor pool, which will disseminate new knowledge and related skills rapidly throughout the cluster.

* ***Value added and value chain***
  Value added is the value that "industry adds to its inputs by using the factors of production. It is the value of total output less the value of purchased materials and services. The strategy to enhance value adding activities is to move along the "value chain" which is the range of activities undertaken by an industry group within a region in the process of bringing a product from its conception to its final stage.
* ***Key suppliers***
  This is one of the key features of cluster-based industrial development. Currently, the core industries in Malaysia have limited access to domestic sources of high quality inputs and services that meet international standards. The availability of suppliers will enhance the ability of core indigenous firms to develop new products to world standards and increase the international competitiveness of firms.
* ***Imperative economic foundation***
  The responsiveness of sources of factor inputs constitute the economic foundation that is vital for the success of cluster-based industrial development. These factor inputs include human resources, technology, finance and physical infrastructure.

Categories of Industrial Clusters

In line with the manufacturing ++ strategy, three broad clusters are identified. There are:

- ***Internationally linked clusters***
  These clusters are primarily multinational company-driven. Their products are meant for the global market, and hence their growth and performance are influence substantially by global factors. The industries under this cluster includes electrical and electronics (consumer electronics, semiconductors and components, computers, electrical appliances and apparatus), chemicals (petrochemicals, palm oil products, and pharmaceuticals); textiles and apparels.
- ***Resources-based clusters***
  These are industries where indigenous participation and ownership are high. They are also supported by well established R&D capabilities. Many of these companies are already world leaders in certain products, most notably palm oil and rubber products. The industries under these clusters include resource based and food products, and agro-based and food products.
- ***Policy driven cluster***
  This particular cluster is regarded by the government as strategic industries for the development of specific technological capabilities, industries, and competencies in the country. The industries categorized under these clusters are transportation (automotive, aerospace, shipbuilding and repair), materials (ceramics, metals), and machinery.

Conclusion

This paper has discussed the structural transformation processes taking place which respect to the roles of the manufacturing sector in spearheading Malaysia's economic growth towards realising an industrial nation status by 2020. It has been shown that Malaysia achieved remarkable economic growth in a short span of time through the influx of FDIs and foreign technology. As 'natural' development process was being disregarded in the quest for economic success, the country is presently facing mounting problems concerning human resources development, technological base, economic linkages and support

industries, and environmental degradation and pollution.

The cluster-based industrialization strategies under IMP2 were formulated primarily to address these problems. The broad emphases of this strategy favours multifaceted policies unlike past strategies which focused on selected sectors. Effective policy coordination is therefore imperative for the success of such broad-based policies. It is not clear in Malaysia to date whether the more "powerful" institution for industrial policy making should be MITTI, MIDA or EPU or another agency (Jomo, 1995). In any case, a strong institutional framework with broad coordination powers needs to be established to provide greater focus and effective policy coordination while simultaneously addressing environmental degradation and pollution issues which have become more acute over the last decade.

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